

Name:

Date:

Exam: Function Reflections (Solution version 19)

1. Let function f be defined by the polynomial below:

$$f(x) = -3x^4 - 7x^3 - 4x^2 - 6x - 9$$

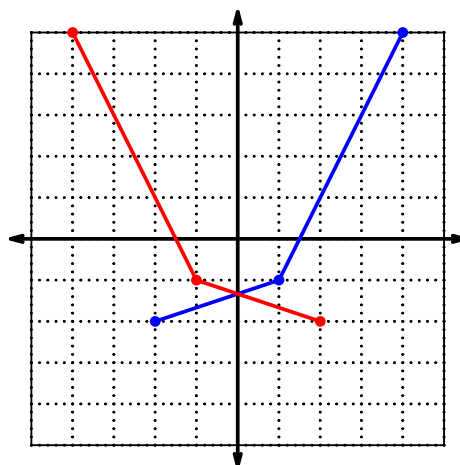
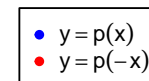
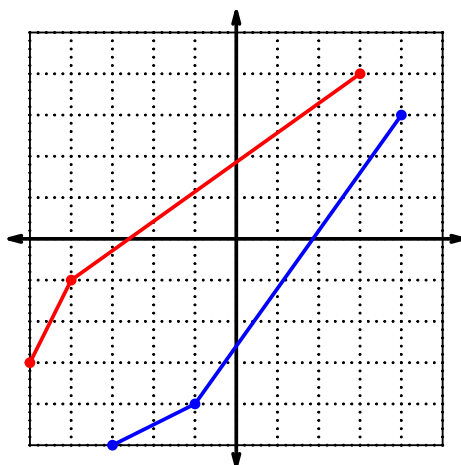
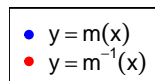
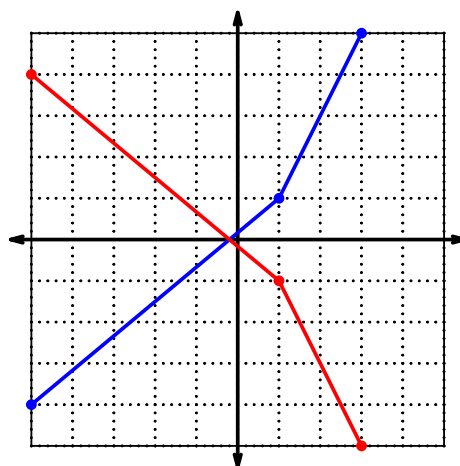
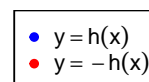
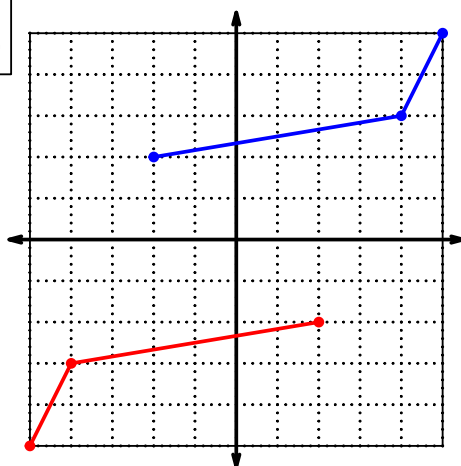
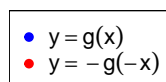
Draw lines that match each function reflection with its polynomial:

Reflections

Polynomials

$f(-x)$	●	●	$3x^4 - 7x^3 + 4x^2 - 6x + 9$
$-f(-x)$	●	●	$3x^4 + 7x^3 + 4x^2 + 6x + 9$
$-f(x)$	●	●	$-3x^4 + 7x^3 - 4x^2 + 6x - 9$

2. In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions f , g , and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	9	5	6
2	1	9	4
3	7	2	1
4	5	7	3
5	2	4	7
6	3	8	9
7	8	1	2
8	6	6	5
9	4	3	8

3. Evaluate $h(3)$.

$$h(3) = 1$$

4. Evaluate $f^{-1}(4)$.

$$f^{-1}(4) = 9$$

5. Assuming f is an **even** function, evaluate $f(-8)$.

If function f is even, then

$$f(-8) = 6$$

6. Assuming g is an **odd** function, evaluate $g(-7)$.

If function g is odd, then

$$g(-7) = -1$$

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7. A function, f , is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g , is **odd** if $g(x) = -g(-x)$ for all x in the domain.

Let polynomial p be defined with the following equation:

$$p(x) = x^2 - 1$$

- a. Express $p(-x)$ as a polynomial in standard form.

$$p(-x) = (-x)^2 - 1$$

$$p(-x) = x^2 - 1$$

- b. Express $-p(-x)$ as a polynomial in standard form.

$$-p(-x) = -(x^2 - 1)$$

$$-p(-x) = -x^2 + 1$$

- c. Is polynomial p even, odd, or neither?

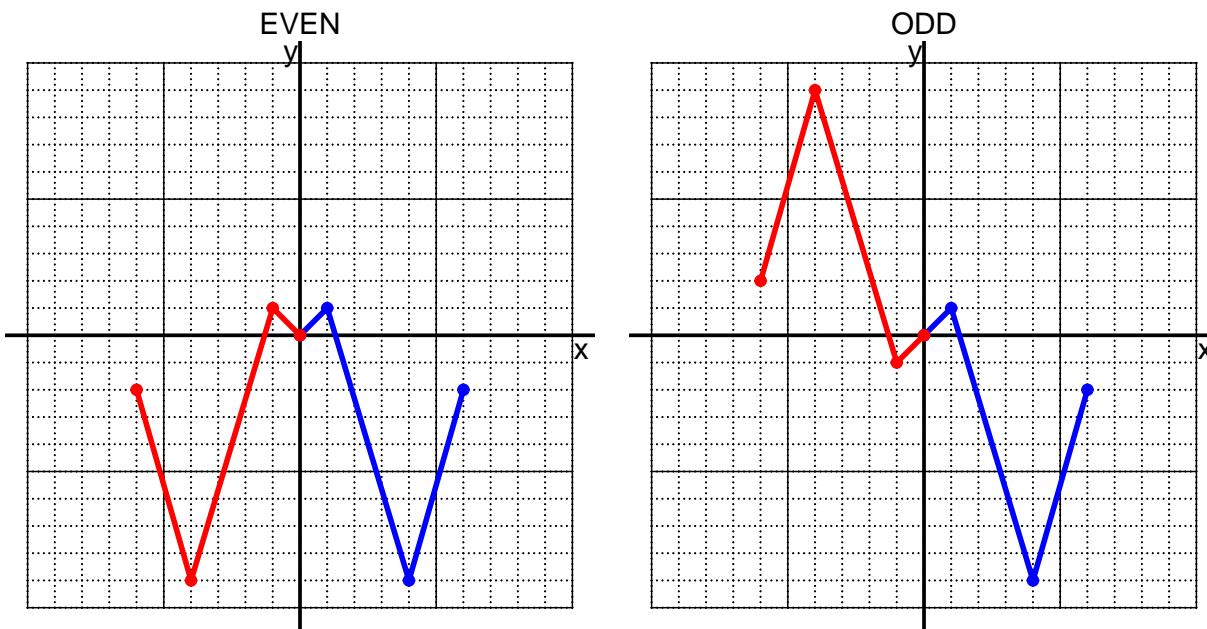
even

- d. Explain how you know the answer to part c.

We see that $p(x) = p(-x)$ for all x because $p(x)$ and $p(-x)$ are equivalent polynomials. Thus function p satisfies the criterion for being an even function.

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8. I have drawn half of a function. Draw the other half to make it even or odd.



9. Let function f be defined with the equation below.

$$f(x) = 9(x - 2)$$

a. Evaluate $f(10)$.

step 1: subtract 2
step 2: multiply by 9

$$f(10) = 9((10) - 2)$$

$$f(10) = 72$$

b. Evaluate $f^{-1}(36)$.

step 1: divide by 9
step 2: add 2

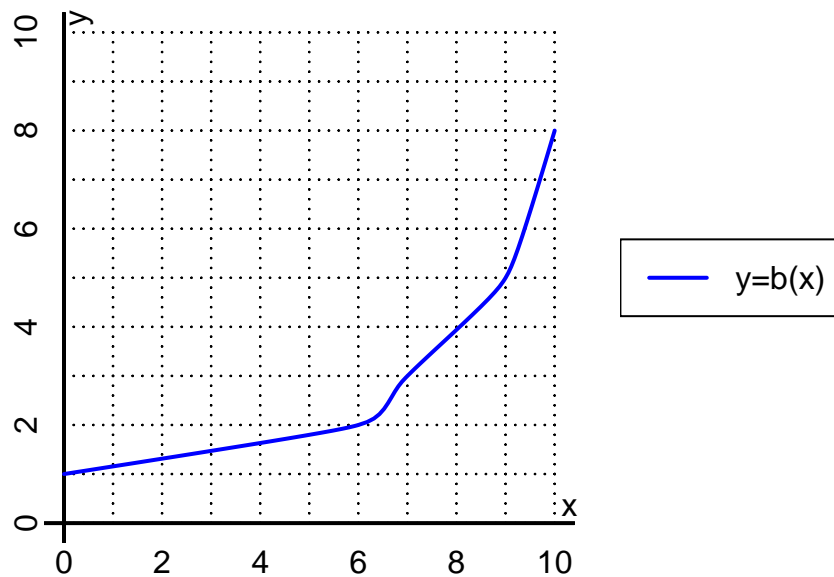
$$f^{-1}(x) = \frac{x}{9} + 2$$

$$f^{-1}(36) = \frac{(36)}{9} + 2$$

$$f^{-1}(36) = 6$$

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10. The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(7)$.

$$b(7) = 3$$

b. Evaluate $b^{-1}(2)$.

$$b^{-1}(2) = 6$$

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11. Function f is defined by the table below.

a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	5	-5	-5	5
-1	-3	3	3	-3
0	0	0	0	0
1	3	-3	-3	3
2	-5	5	5	-5

b. Is function f even, odd, or neither?

odd

c. How do you know the answer to part b?

Function f is odd because column $-f(-x)$ matches column $f(x)$ exactly.